Challenge TB - Cambodia

Year 1

Annual Report

October 1, 2014 – September 30, 2015

October 30, 2015

Cover photo: Health care worker (HCW) TB screening activities conducted by CENAT team, at Maung Reussey hospital, Battambang province. Panel reviews abnormal image of CXR films during the HCW screening. Photo credited by Ly Mena.

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Disclaimer
The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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List of Abbreviations and Acronyms

ACF	Active Case Finding
AFB	Acid Fast Bacilli
CCC-OC	Committee of the Country Coordinating Committee
CENAT	National Centre for Tuberculosis and Leprosy Control
HC	Health Center
CCM	Country Coordinating Mechanism
CI	Contact Investigation
CNR	Case Notification Rate
COP	Chief Of Party
CTB	Challenge TB
CXR	Chest X Ray
DM	Diabetes Mellitus clinic
DQA	Data Quality Audit
DR-TB	Drug Resistant
ECF	Enhanced Case Finding
EQA	External Quality Audit
ERR	Electronic Recording and Reporting
e-TBM	e-TB Manager
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GLI	Global Laboratory Initiative
HCP	Health Care Provider
ICF	Intensive Case Finding
IPD	In-Patient Department
IPT	Isoniazid Preventive Therapy
KNCV	KNCV Tuberculosis Foundation
LTBI	Latent TB Infection
MDR	Multi-Drug Resistant
MSH	Management Science for Health
NFM	New Funding Model
NSP	National Strategic Plan
NTP	National TB Program
OD	Operational District
OPD	Out-Patient Department
PCF	Passive Case Finding
PEPFAR	President's Emergency Plan for AIDS Relief
PMDT	Programmatic Management Drug Resistant TB
PMU	Project Management Unit
PHD	Provincial Health Department
PR	Principal Recipient
TRP	Technical Review Panel
QA	Quality Improvement
RH	Referral Hospital
RIT	Research Institute of Tuberculosis
SLD	Second Line Drug
SLIPTA	Stepwise Laboratory Improvement Process Towards Accreditation
TA	Technical Assistance
TB	Tuberculosis
TST	Tuberculin Skin Test
USAID	United States Agency for International Development
VHSG	Village Health Support Group
WHO	World Health Organization
Xpert	GeneXpert MTB/RIF

1. Executive Summary

Since October 2014, the United States Agency for International Development (USAID) has funded the Challenge TB (CTB) project, a 5-year project globally led by the KNCV Tuberculosis Foundation (KNCV) overseeing a consortium of seven international organizations. In Cambodia, FHI 360 leads the project in collaboration with Management Sciences for Health (MSH) and the World Health Organization (WHO). The project was granted $2,290,224 USD to cover a 9 month period from 01 January to 30 September 2015 to support the National TB Program (NTP) to increase TB case notification and close the gap of the "missing cases" (which was estimated to be approximately one third of total estimated cases[1]) through innovative interventions at both community and health facility levels. To achieve its objectives, CTB in Cambodia focuses on sub-objective areas: enabling environment; comprehensive, high quality diagnostic network; patient centered care and treatment; targeted screening for active TB; infection control; management of latent TB infection (LTBI); political commitment and leadership; quality data, surveillance and monitoring and evaluation; and human resource development.

Highlights of CTB achievements in Cambodia over the 9 months period are summarized below.

1. Patient centered care and treatment

a. Prisoners and inmates

In 2015, annual active case finding (ACF) was performed in all 10 targeted prisons using chest x-ray (CXR) and GeneXpert MTB/RIF (Xpert). A total of 5,827 inmates (99% of all incarcerated) was screened with routine annual CXR and among those, 75 TB cases (1.3%) were diagnosed and put on treatment. In addition, 15 patients were identified via passive case-finding. A total of 90 TB patients were diagnosed and put on TB treatment during our first 7 month period (January-July). 7 inmates were released during TB treatment. All of them were successfully followed up and continued their treatment in the community. Systematic symptom screening has been successfully implemented at entry for all new inmates. The case notification rate (CNR) decreased by 30% from 2,188/100,000 in 2013 to 1,542/100,000 in 2015 among this high risk prison population.

b. Elderly

In Year 1, a major focus of CTB was to address one of the key epidemiologic findings of the TB prevalence survey of 2011, which found a high TB prevalence among older Cambodians. Semi ACF activities (also called "Enhanced Case Finding") were conducted among elderly Cambodians visiting pagodas. Within four months (June – Sept) of implementation, 3,033 elderly, including monks and Ajars, were screened for TB symptoms, of which 59% (1,797/3,033) had at least one symptom suggestive of TB. A total of 37 active TB cases (2% of presumptive TB patients) were identified with bacteriologically confirmed TB and an additional 58 others with strong suggestion of TB based on their symptoms (but not sputum smear positive) were referred to RH for further evaluation.

d. Childhood TB

Childhood TB care and prevention has become routine work at both the community level and in referral hospitals; the Village Health Support Group (VHSG) identified them through contact investigations (CI) and referred them to the referral hospital (RH) where TB physicians were trained in diagnosis and treatment. During 5 months (May – Sept), CTB successfully continued the expansion of diagnosis and treatment sites to 25 operational districts (OD) within 12 provinces. Children who were close contacts of bacteriologically confirmed TB index patients were screened for TB at households in the community. A total of 361 (23%) out of 1,559 children screened had signs and symptoms requiring further investigation for possible TB at a RH. Of these presumptive TB patients, 32 children (9%) were diagnosed with TB and put on treatment and 287 children (under 5) were enrolled on Isoniazid Preventive Therapy (IPT) after ruling out active TB.

e. **Hospital Engagement**

CTB implemented the hospital engagement approach in five RHs which have a high burden of outpatients. TB symptom screening was introduced in all departments within the hospital including out-patient and in-patients departments (IPD), pediatric and diabetes (DM) clinics. Cough triage

[1] National TB prevalence survey

was implemented in all out-patient departments (OPD) of five RHs. TB symptom screening was included in in-patient medical forms to remind HCP (Health Care Provider) to screen for TB. From January to September 2015, 132,115 clients presented at an OPD or IPD. Those who have TB sign and symptom were then referred and screened for TB at TB units within the hospitals. 1,499 of the screened patients were diagnosed with TB (1.1%, prevalence of 1,100/100,000) and put on treatment.

f. Comprehensive, high quality of diagnostic network

CTB works with 67 microscopy centers in CTB geographic areas (see annex IV), where laboratory technicians were trained and assessed using standard, internationally-recognized external quality assurance (EQA) criteria. Slide selection, cross checking of smear slides, and on-site evaluation for EQA were conducted on a quarterly basis.

The results of the first quarter 2015 show that out of 215 microscopy laboratories, 207 (96%) laboratories participated in the EQA evaluation. Of these, 182 (88%) laboratories showed adequate performance (i.e., false positive or high false negative <5%).

NTP continues to scale up GeneXpert MTB/RIF (Xpert) testing. Patients being tested are those who are considered at high risk for MDR-TB including retreatment cases, potential treatment failure (i.e., no bacteriological conversion smear by month 3 of treatment), MDR-TB contact, HIV-TB co-infected patients with bacteriologically confirmed TB, and other high risk groups including elderly and diabetic patients.

Until now, 25 laboratories are equipped with Xpert machines. CTB provided TA to maintain those machines through annual calibrations and trouble-shooting at the field level in consultation with Cepheid. The local Laboratory Technical Officer has also worked to expand his own capacity to be able to provide the calibration and trouble-shooting via the instruction in the Xpert manual and communication with Cepheid via email. From January to June 2015, NTP conducted 5,869 tests of which 14% were MTB positive TB, of those 0.6% was Rifampicin Resistant, and 5.2% were Invalid/No Result/Error.

This year, CTB participated in the laboratory quality assessment conducted by WHO using TB Laboratory Quality Management Systems Towards Accreditation Harmonized Checklist. The report is being reviewed by NTP.

g. Quality data, surveillance and monitoring and evaluation

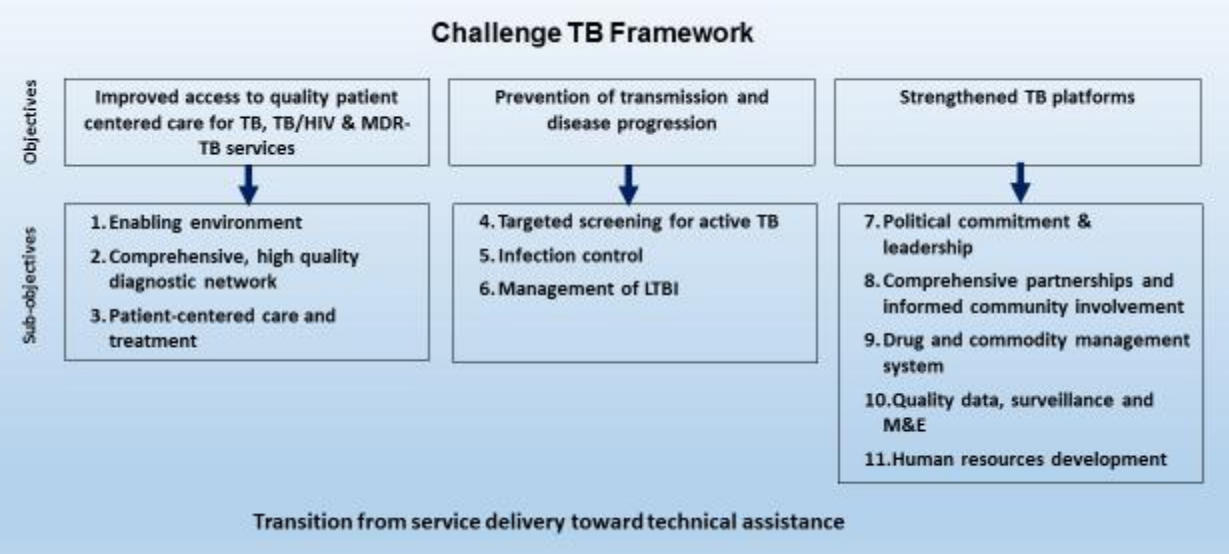
e-TB Manager (e-TBM) has been implemented in 10 out of 11 MDR sites which cover the whole country. The system is able to generate a real time report on MDR-TB. During Year1, the laboratory module, one of the three modules, was customized to meet the need of the program. The system was expanded for both MDR and Drug Susceptible TB surveillance. CTB has successfully handed it over to NTP at the end of September 2015.

2. Introduction

The TB prevalence survey of 2011 showed that TB prevalence among SS+ cases for those over 15 years of age decreased 38% from a rate of 362/100,000 to 271/100,000 between 2002 and 2011. However, Cambodia still has one of the highest incidence and prevalence rates in the world. The Challenge TB project started in October 2014 for the first year of a 5-year project globally led by the KNCV Tuberculosis Foundation (KNCV) overseeing a consortium of organizations in Cambodia including: FHI 360, Management Sciences for Health (MSH), and World Health Organization (WHO).

The project was granted $2,290,224 USD for Year 1 to provide technical assistance (TA) to the NTP in Cambodia to develop new innovative strategies for TB control with the primary goal **to improve case detection** and to close the **"diagnosis gap"** by targeting specific risk groups.[2] In order to achieve this goal, CTB builds on successful approaches (**semi-active case finding** among elderly aged 55 years and above and **contact-investigation)** which have proven to be effective and have resulted in an increase in TB case notification compared to the routine TB services of passive case-finding. In year 1 the project covered 399 HC, 25 ODs in 12 provinces (please see annex IV).

Figure 1: Challenge TB Framework



Overall management of the project is conducted by the core team from FHI 360, MSH and WHO based in Cambodia, with back stop support from the Project Management Unit (PMU)/KNCV and respective headquarter offices as required. The team, led by the Chief of Party (COP)/Project Director from FHI 360, is responsible for overall leadership, management and successful implementation of the project in Cambodia. This annual report for CTB outlines the project's key accomplishments within sub-objective areas:

- Enabling Environment;
- Comprehensive, high quality diagnostics;
- Patient centered care and treatment;
- Target screening for active TB;
- Infection control;
- Management of latent TB infection (LTBI);
- Political commitment and leadership;
- Quality data, surveillance and monitoring and evaluation;
- Human resource development.

[2] It was estimated approximately one third of total estimated cases, the National TB prevalence survey.

Country Achievements by Objective/Sub-Objective

Objective 1. Improved Access

Sub-objective 1. Enabling environment

In Year 1, CTB planned to work with 25 ODs in 12 provinces on two main strategies, a rural and an urban one, in order to increase TB case detection and close the diagnostic gap. Our rural strategy includes Community DOTS which aims to target elderly people and children. The urban strategy includes hospital engagement, TB care and prevention in congregate settings (prison) and Private Public Mix. More description of the activities and result is in section 3.1.

Key Results:
In Year1, CTB activities were implemented in 25 Operational Divisions (ODs) in 12 provinces and achieved 100% of target coverage at OD, prison and RHs levels. However, at HC level, CTB covered 399 which equals 97.2% of the target (411 HC). The lack of achievement is due to the restructure of HC under each OD, where a few HCs (that were previously within CTB's ODs) were moved to another OD.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	1.1.3. #/% of public sector/parastatal care facilities that report TB cases to the NTP (stratified by type: military, social security, etc.)	Description: Proportion of public sector/parastatal care facilities that report TB cases to the NTP (stratified by type: military, social security, etc.) Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of public sector/ parastatal care facilities that report TB cases to the NTP Denominator: Total number of public sector/ parastatal care facilities	246 CTB supported sites	426 (411 HC, 10 Prisons, 5 RH)	414 (399 HCs, 10 Prisons, 5 RHs)

Sub-objective 2. Comprehensive, high quality diagnostics

In Year 1, CTB provided support for laboratory monitoring and training, and reported on the utilization of the Xpert and performance of LED microscopes which were procured under TB CARE I. CTB provided TA on the implementation of EQA and the development of EQA Standard Operating Procedures. CTB's laboratory network included 42 microscopy centers, where laboratory technicians were trained and assessed using standard (i.e. international) external quality assurance (EQA) criteria. Slide selection, cross blind rechecking of smear slides, and on-site evaluation for EQA were conducted on quarterly basis.

Supportive supervision activity to TB laboratory sites jointly conducted by CTB and NTP team, photo credited by Ly Mena

Key Results:

Twenty slides were collected from each laboratory for re-staining, and blinded re-examination using the existing 18 quality assurance (QA) centers. The result from the first quarter of 2015 showed that out of 215 microscopy laboratories, 207 (96%) laboratories participated in the assessment. Of them, 182 (88%) laboratories showed adequate performance (i.e., high false positive or high false negative <5%). CTB monitors and provides feedback for this activity. *The coverage of laboratory performed EQA is lower than originally proposed due to the delay in executing contracts.*

	Number of Microscopy Center	Result lab/QA Center						False Positive Rate	False Negative Rate	Agreement Rate
		Pos/Pos	Pos/Neg		Neg/Pos		Neg/Neg			
			Low	High	Low	High				
CTB	42	79	1	1	4	2	741	2.5%	0.8%	99%
Total	207	367	1	14	9	24	3,709	3.9%	0.9%	99%

Table 1: Summary result of EQA assessment conducted in CTB coverage areas

To increase case finding and ensure rapid diagnosis including that of drug resistant tuberculosis, NTP continues to scale up Xpert MTB/RIF (Xpert) testing. Currently, 25 laboratories are equipped with Xpert machines. CTB provided TA to maintain these machines through annual calibrations and trouble-shooting at the field level in consultation with Cepheid. CTB also monitors the results of Xpert tests on a quarterly basis. In Jan-Jun 2015, NTP conducted 5,869 tests of which 14% were MTP positive, of which 0.6% were Rifampicin Resistant and 5.2% were Invalid/No Result/Error. *All Xpert machines are being well maintained and are functional at the start of APA1 Challenge TB, and achieving targeted goals. The proportion of unsuccessful Xpert tests decreased from 22% at the baseline in 2014 to 5.2% in 2015.*

CTB also continues to help NTP to assure the quality of conventional drug sensitivity testing using annual proficiency testing by liaising with the Research Institute of Tuberculosis (RIT), Japan. This year, CTB also participated in the assessment conducted by WHO to the National Reference Laboratory of CENAT to measure its readiness for an accreditation. TB Laboratory *Quality Management Systems Towards Accreditation Harmonized Checklist* which incorporates *Stepwise Laboratory Improvement Process Towards Accreditation (SLIPTA)* and *Global Laboratory Initiative (GLI) Stepwise Process towards TB Laboratory Accreditation* was used as tool for the assessment. The interview were held with directors and laboratory staff. The result of the assessment was submitted to director of NTP to review and endorse.

Indicator 2.2.1 was not achieved as the number of microscopic HCs enrolled in EQA is less that the target set. The target was set beyond the actual CTB's geographic target areas.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	2.2.1. #/% of laboratories enrolled in EQA for smear microscopy	Description: Proportion of laboratories enrolled in External Quality Assessment for smear microscopy Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of laboratories enrolled in EQA for smear microscopy Denominator: Total number of laboratories performing smear microscopy	31% (67/215)	31% (67/=215)	18% 42/215 7.1% (3/42) has inadequate performance
2	2.4.2. #/% of Xpert machines that are functional in country (stratified by Challenge TB, other)	Description: Proportion of Xpert machines that are functional in country Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of Xpert machines that are functional Denominator: Total number of Xpert machines.	53% (23/43)	90% (39/43)	100% 38/38 CTB=6; other = 32
3	2.4.5. % unsuccessful Xpert tests	Description: This indicator measures proportion of unsuccessful Xpert tests Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of unsuccessful Xpert tests Denominator: Total number of Xpert tests.	22% (614/2724)	20%	5.2% (389/7,431)

Sub-objective 3. Patient-centered care and treatment

Urban strategy:

a) Prison TB/HIV Services

In 2009, the TB prevalence rate in the prison setting was estimated through active case finding as 18 times higher than the general population: approximately 5,000 per 100,000.

In Year 1, CTB planned to: screen all inmates upon entry; conduct passive case finding using a standardized check-list for symptoms in all prisons; and conduct annual screening (active case finding) by X-ray and Xpert testing for those with abnormal X-rays and with TB symptoms.

Key Results:

Treatment success rates in the 10 prisons supported by the project was maintained at >85%.

In year 1, ACF and routine TB symptom screening at entry have been implemented in all 10 prisons. A total of 90 TB cases were diagnosed among 5,827 prison inmates (prevalence 1,544/100,000). This number and rate indicates a decreased prevalence (figure 2). During this year, nearly all inmates (6/7) who were on TB treatment and released from prisons were referred and received treatment at the community and another one was repatriated to Malaysia. Systematic symptom screening at entry was successfully implemented for all new inmates. The trend in case notification rate (CNR) among prisoners decreased by 30% from 2,188/100,000 in 2013 to 1,542/100,000 in 2015.

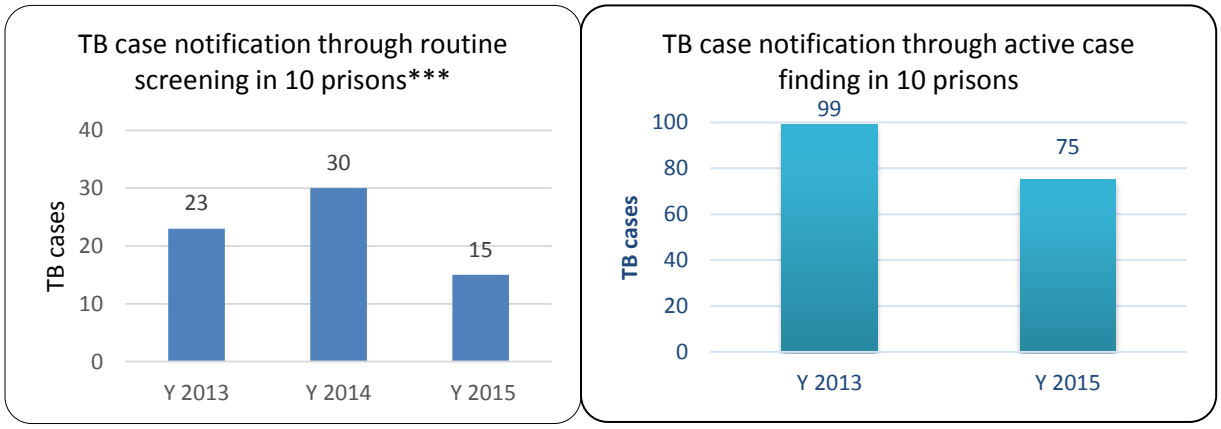
Table 1 shows that the proportion of case notification in Prah Sihanouk prison is the highest. *This indicator was achieved at 100%.*

Table 2: TB case detection in prisons under CTB support (2015) through routine screening and ACF

Prison Name	Inmate Population	# inmate screened	Routine Screening			ACF**			Total Case Detection (%)
			Bacterio-logically confirmed	Clinically diagnosed	Total	Bacterio-logically confirmed	Clinically diagnosed	Total	
Correction Center 3	1,284	106	2	1	3	12	12	24	27 (2.10)
Kamong Cham	933	31	3	0	3	5	4	9	12 (1.29)
Kampong Speu	370	9	2	0	2	2	1	3	5 (1.35)
Takeo	330	0	0	0	0	1	4	5	5 (1.52)
Kampot	362	19	1	0	1	1	3	4	5 (1.38)
Prah Sihanouk	418	36	1	2	3	2	8	10	13 (3.11)
Takmao	1,140	0	0	0	0	5	4	9	9 (0.79)
Prey Veng	372	0	0	0	0	0	5	5	5 (1.34)
Svay Rieng	310	0	0	0	0	1	2	3	3 (0.97)
Koh Kong	308	37	1	2	3	0	3	3	6 (1.95)
Total	**5,827**	**238**	**10**	**5**	**15**	**29**	**46**	**75**	**90 (1.54)**

** All inmates in prisons were screened by ACF

*Figure 2: TB case notification through both routine case finding and ACF in 10 prisons***



** No active case finding conducted in 2014. There was an increase in TB case notification in 2014 due to no active case finding in that year.
*** Timeframe of report of case notification through routine TB symptom screening is from January to September.

b) **Hospital Engagement**

CTB supported five provincial hospitals, namely Sampov Meas, Battambang, Moung Rusey, Kampong Speu and Korng Pisey referral hospitals (RH). Prior to the implementation, CTB conducted an assessment to assess TB knowledge of health care providers, the current practice of TB screening among presumptive TB patients, inter-departmental referral system, diagnosis and treatment practice and to find key obstacles and areas for improvement. The findings are as follows:

- TB knowledge among health care providers outside the TB department is poor and, in fact, most could not recall all four TB symptoms;

- Diagnostic tools: Three RHs (Battambang, Sampov Meas and Kampong Speu) have smear microscopy, a functioning X-ray machine and X-pert on site while two RHs (Moung Rusey and Korng Pisey) have smear microscopy and an X-ray machine. In addition, Battambang RH is able to perform TB culture. The overall quality of performance on laboratory of all five hospitals is still a concern;
- Infection Control: the infection control in the Battambang lab is good with good operational guidelines;
- Cough triage was not implemented at all OPD of all RHs;
- M&E: there was lack of documentation and effective feedback to the referring clinician, and no communication between wards, resulting in a delay in the provision of diagnostic results and initiation of treatment.

Key Results:

Cough triage and the FAST ("Find Actively, Separate Safely and Treat") strategy were implemented in those five referral hospitals. Patients who are coughing are separated and provided with masks. All presumptive TB patients are examined for further diagnosis. TB symptom screening questions have been integrated into the in-patient medical record form to remind HCP to screen for TB.

From January to September 2015, 1,499 (1.5%) of the total 132,115 patients presenting at the outpatient and inpatient departments in the five hospitals were diagnosed with TB and all of them received TB treatment (table 2).

Table 3: TB case finding in 5 hospitals under Hospital Engagement, CTB (Jan – Sept, 2015)

Name of Referral Hospital	# of patient presenting at hospital	# of patient diagnosed with TB	(%)	# of bacteriologically confirmed pulmonary TB	(%)	# of clinically diagnosed pulmonary TB	(%)	Extra pulmonary TB (%)	
Battambang	69,113	600	(0.9)	174	(29.0)	150	(25.0)	276	(46.0)
Maung Russey**	16,495	242	(1.5)	13	(5.4)	198	(81.8)	31	(12.8)
Sampov Meas	16,697	64	(0.4)	11	(17.2)	30	(46.9)	23	(35.9)
Kampong Speu	21,460	307	(1.4)	189	(61.6)	37	(12.1)	81	(26.4)
Korng Pisey**	8,350	286	(3.4)	43	(15.0)	113	(39.5)	130	(45.5)
Total (%)	132,115	1,499	(1.5)	430	(25.6)	528	(41.1)	541	(33.3)

** Unavailability of Xpert machine at the hospital

Rural strategy

a) Elderly

In Year 1, a major focus of CTB was to address the key epidemiologic finding of increased TB prevalence and mortality among elderly. Semi Active Case-finding activities (also called "Enhance Case Finding") was conducted among elderly Cambodians visiting 86 pagodas in the 9 ODs under CTB's target areas. Health Center (HC) staff and Village Health Support Group (VHSG) went together early in the morning to pagodas during holy days to screen elderly and monks for TB symptoms. Rather than referring elderly individuals with presumed TB to distant TB screening centers, sputum samples were collected on-site and transported to laboratory centers for Xpert test or HCs for smear microscopy where Xpert is not available.

Contact investigation tools were developed and introduced to 399 HCs under the support the project. HC staff records the names of bacteriologically confirmed TB index patients in the contact investigation forms and provides them to Village Health Support Groups (VHSG) in the respective villages. VHSGs contact people (household and neighbors) who are close contacts of the index patient, register them in the record forms and refer them to HC for TB screening.

Key Results:

During a four month period, approximately 3,000 elderly including monks and Ajars were screened for TB symptoms, of which 59% (1,797/3,033) had at least one symptom suggestive of TB. Even among this initial small screening sample, 33 cases of active TB were identified, of whom 89% (33/37) with bacteriologically confirmed smear positive TB. Others with strong suggestion of TB by symptoms (but not sputum smear positive) were referred to RH for further diagnostic evaluation by Xpert and CXR, and results are pending from these.

Table 4: TB case finding through Semi Active Case Finding at Pagodas

# of Semi ACF conducted	# people screened	# of persons with presumed TB	Bacteriologically confirmed TB	Clinically diagnosed TB
86	3,033	1,797	33	4

b) Childhood TB

CTB implemented contact investigation (CI) at the community level to identify and refer presumptive TB children to HC and RH for work-up and diagnosis. Children ruled-out of having active TB get INH preventive therapy. In order to facilitate this care, CTB conducted trainings to HC and RH staff on clinical management of childhood TB, Tuberculin Skin Test administration (TST), chest x-ray reading skills and Isoniazid Preventive Therapy (IPT). The project also continued to monitor, supervise and provide on-the-job training for NTP staff including provincial TB supervisors, OD TB supervisor, staff at RH and HC.

Key Results:

Within Year 1, 1,559 close contacts of smear positive index were screened for TB, of which 390/1,559 children (25%) were eligible for IPT, and of which 103/390 (26%) refused IPT. 287/390 (73%) of eligible children (under 5) were enrolled for IPT, and 361 (23.2%) children were referred to RH for clinical evaluation including TST, physical and history examination and chest x-ray. 32 (9%) of those referred were diagnosed with TB and treatment was initiated. The data demonstrate the high prevalence of TB disease among children who are close contacts of sputum-smear positive index patients.

To address the over-diagnosis of extra-pulmonary TB, which has been documented to be as high as 96% of all childhood TB cases, CTB and NTP conducted an assessment during a supervision visit. The data is currently being analyzed.

In this sub-objective area, three (3.1.1, 3.1.8 and 3.1.13) out of nine indicators did not achieve the target. This is due to delays in USAID approval and signing of agreements and project start-up. The target was set based on 8 month implementation but actual implementation was only 6 months (April – Sept). For one indicator (3.2.2) data was not able to be collected and 5 indicators (3.1.10, 3.2.16, 3.2.22 and 3.2.22) achieved the target. Indicator 3.2.19 was lower than the target; we were not able to obtain information on TB patients who were released and transferred while on treatment as the current information system is not able to follow up until treatment completion.

c) TB case notifications of adults and children with TB

Within six (6) months (January – June) of implementation, 3,985 new TB cases of adults and children were diagnosed and treated (table 4). The TB case notification referred from VHSG was approximately 47% based on the completeness of the report from five (5) ODs (date of report not available).[3]

[3] CTB program data from Jan to June 2015

Table 5: New TB case detection in 25 ODs: Jan – Jun 2015 at community and HC levels (9 ODs with comprehensive package and 16 focus only on childhood TB)

Type of TB	Adult (%)		Child < 15 (%)		Total
Bacteriologically confirmed pulmonary TB	792	(37.8)	6	(0.3)	798
clinically diagnosed pulmonary TB	782	(37.3)	367	(19.4)	1,149
EPTB	520	(24.8)	1,518	(80.3)	2,038
All Forms	2,094	(100)	1,891	(100)	3,985

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	3.1.1. # of cases notified (all forms)	Description: The number of TB cases (all forms) reported by the NTP Indicator Value: Number Level: National and Challenge TB geographic areas Numerator: Number of all TB cases (bacteriologically confirmed + clinically diagnosed; includes new & relapse cases) reported in the past year	8,366 (2013)	6,650 (8 mths) CTB's coverage areas	4,537 (6 mths) Prisons: 90 Hospital engagement: 1,499 Elderly and children: 886+1891 Others: 171 CTB's coverage areas
2	3.1.8. % of TB cases (all forms) diagnosed among children (0-14)	Description: This indicator measures proportion of TB cases (all forms) diagnosed in children 0-14 years of age. When childhood TB is a priority, being able to report on and measure changes in case notification by age group is important. Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of TB cases (bacteriologically confirmed + clinically diagnosed; includes new & relapse cases) diagnosed in children 0-14 years of age in the past year. Denominator: Total number of all TB cases (bacteriologically confirmed + clinically diagnosed; includes new & relapse cases) reported in the past year	3,989 (2013)	3,250 (8 mths) CTB's coverage areas	1,891 (6 mths) CTB's coverage areas
3	3.1.10. #/% of prisons conducting regular screening for TB	Description: Proportion of prisons conducting regular screening for TB according to internationally recommended national policy Indicator Value: Percent Level: National Numerator: Number of prisons conducting regular screening for TB Denominator: Total number of prisons	10	10 (CTB)	10 (10/10, CTB)
4	3.1.13. #/% of presumptive TB patients referred	Description: Proportion of presumptive TB patients referred by community referral systems	NA	70% (46,550 /66,500)	27% 5,612/2,0760

	by community referral systems	Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of presumptive TB patients referred by community referral systems Denominator: Total number of presumptive TB patients			Data will be provided in Q1, FY16
5	3.2.1. Treatment success rate among bacteriologically-confirmed TB cases	Description: The proportion of a cohort of new and relapse TB cases (bacteriologically confirmed and clinically diagnosed) registered in a specified period that successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed"). Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of new and relapse TB cases (all forms) registered in a specified period that were cured or completed treatment. Denominator: Total number of new and relapse TB cases (all forms) registered in the same period.	92% (2013)	> 92%	93%
6	3.2.2. Treatment success rate for pediatric TB patients	Description: The proportion of a cohort of new and relapse TB pediatric cases (bacteriologically confirmed and clinically diagnosed) registered in a specified period that successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed"). Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of new and relapse TB pediatric cases (all forms) registered in a specified period that were cured or completed treatment. Denominator: Total number of new and relapse TB pediatric cases (all forms) registered in the same period.	NA	> 92%	99% (1,219/1,227) Jan-Jun 2014 cohort
7	3.2.16. #/% of prisons reporting TB cases to the NTP	Description: This indicator measures proportion of prisons reporting TB cases to the NTP Indicator Value: Percent Level: National Numerator: Number of prisons reporting TB cases to the NTP Denominator: Number of all prisons	10 (CTB)	10	10 (100%)
8	3.2.19. Treatment success rate of TB patients diagnosed in prison	Description: The proportion of a cohort of new and relapse TB cases (bacteriologically confirmed and clinically diagnosed) registered in a specified period in prison that successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed"). Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of new and relapse	90% (2013, in 10 prisons)	> 90%	82%

		TB cases (all forms) registered in a specified period in prison that were cured or completed treatment. Denominator: Total number of new and relapse TB cases registered in the same period in prison			
9	3.2.22. #/% of TB patients followed by community-based workers/volunteers during at least the intensive phase of treatment	Description: The purpose is to monitor an activity intended to improve adherence to anti-TB treatment and its outcomes among TB patients. It will demonstrate the level of implementation of the recommendation that TB patients should be followed by CB workers/volunteers during at least the intensive phase of treatment Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of TB patients registered in a specified period that were followed by CB workers/volunteers during at least the intensive phase of treatment Denominator: Total number of TB patients registered in the same period in the area	NA	50% (3,325 / 6,650) CTB's coverage areas	81% 3,257/4,013 CTB's coverage areas

Objective 2. Prevention

Sub-objective 4. Targeted screening for active TB

The key result of this section had been described in sub-objective 3. Indicators 4.1.1 and 4.1.2 were not achieved as target set. This was due to the delay in start-up of implementation and because the approach is new to VHSG and HC staff.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timefra me)	Target Y1	Result Y1
1	4.1.1. #/% of eligible index cases of TB for which contact investigations were undertaken	Description: The proportion of eligible index cases of TB for which contact investigations were undertaken Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of index cases of TB for which contact investigations were undertaken during the period of assessment Denominator: Total number of index cases registered during the period of assessment	NA	70% (1200/1700) CTB's coverage areas	37% 618/1,656 CTB's coverage areas
2	4.1.2. #/% of children (under the age of five) who are contacts of bacteriologically-confirmed TB cases that are screened for TB	Description: The proportion of children (<5) who are contacts of bacteriologically-confirmed TB cases that are screened for TB (investigations for TB must be performed in accordance with existing national guidelines) Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of children (<5) who are contacts of bacteriologically-confirmed TB cases	NA	70% (800/ 1200) CTB's coverage areas	670 CTB's coverage areas *Current tool is not able to generate*

		that are screened for TB Denominator: Total number of children (<5) who are contacts of bacteriologically-confirmed TB cases			*the denominator*
3	4.1.3. % of confirmed TB patients by case finding approach (CI, ACF, ICF), by key population and location (ex, slum dwellers, prisoners) (Service cascade)	Description: Proportion of bacteriologically-confirmed TB patients by case finding approach (contact investigation, active case finding, intensified case finding). This information would be stratified by key population (slum dwellers, prisoners, etc.). This measurement may require operations research using a valid tool. Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of bacteriologically-confirmed TB patients identified among investigated among key population group Denominator: Total number of investigated key population group members	NA	20% (1,330/ 6,650)	3.3% (150/ 4,537) Semi ACF = 37 ACF (prison, EH)=81 CI = 32

Sub-objective 5. Infection control

CTB introduced the "FAST" strategy for TB-IC as a key intervention for TB-IC and prevention: **F**ind cases **A**ctively, **S**eparate safely, and **T**reat effectively. NTP and its partners, including CTB, implemented activities related to intensified and active case finding among high risk groups (prisons, contacts, migrants etc.). All five RHs have implemented triage of patients and maintained separate wards for infectious patients; MDR-TB sites instituted isolation rooms. Rapid diagnostic testing (Xpert) was also encouraged to improve early diagnosis and early initiation of treatment.

Key Results:

In FY 15, CENAT and CTB were able to conduct TB screening among health care workers (HCW) in two RH, Maung Reussey and Sampeou Meas. The screening was performed among 245 HCW from the referral hospitals using a symptom check-list, chest x-rays, and Xpert tests. HCW participated in the TB screening at 94% (245/260), from which 100% (245/245) of them underwent chest x-ray and 13% (31/245) were tested with Xpert. No HCWs were diagnosed with TB via Xpert, however, 2.4% (6) had abnormal chest x-rays and clinically diagnosed TB, after CENAT confirmation. All of them were on TB treatment.

TB screening among health care workers in two referral hospitals, photo credited by Ly Mena

In this sub objective, it was not possible to implement IC in all HCs as planned. This underachievement is due to many competing priorities such as the development of new approaches, training provided to HCW on new approaches (semi ACF and CI, hospital engagement) in order to catch up with the target of increase TB notification. In addition, the program started late due to delays in executing grants/contracts.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timefra me)	Target Y1	Result Y1
1	5.1.1. Status of TB-IC implementation in health facilities	Description: This indicator measures the status of TB-IC implementation in health facilities. Indicator value: Score based on below: 0=no TB-IC policy/plan and no organized TB-IC activities; 1=national TB-IC guidelines have been approved and disseminated in accordance with WHO policy; 2=TB-IC being implemented in pilot or limited health facilities; 3=TB-IC implemented nationally and/or national certification program implemented Level: National	2	2	2
2	5.1.2. #/% of health facilities implementing TB-IC measures with Challenge TB support (stratified by TB and PMDT services)	Description: Proportion of health facilities implementing TB-IC measures with Challenge TB support (stratified by TB and PMDT services) Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of health facilities implementing TB-IC measures with Challenge TB support in the area Denominator: Total number of health facilities in the area	NA	25% (106/426) CTB supported sites	3.6% (15/414)
3	5.2.4. Number and % of health care workers diagnosed with TB during reporting period	Description: This indicator measures the percent of HCWs diagnosed with TB (all forms) annually (disaggregated by gender and age). This measurement may require special study using a valid tool. Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of HCWs diagnosed with TB (all forms) during past year Denominator: Total number of HCWs in the same year	NA	2.5% (5/200)	2.4% (6/245) The result is only from CTB activities

Sub-objective 6. Management of latent TB infection

CTB worked with NTP staff and trained staff at HC and RH on TB diagnosis and treatment. Children living in close contact to a smear (+) TB index patient will be screened to rule-out active TB and be put on IPT for 6 months, similar to how PLHIV are screened for IPT.

Key Result:

NTP has developed the policy and guideline on the administration of IPT for PLHIV and children and it was implemented nationwide. In year 1, 287 children (under 5 years) were enrolled on IPT after ruling out active TB, 361 TB suspected children were referred to RH for clinical evaluation including TST, physical and history examination and chest x-ray. Among those referred, 32 (9%) were diagnosed with TB and initiated on treatment. Based on the 2014 cohort, 98% (152/154) of children on IPT have completed the preventive therapy.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	6.1.1. Status of implementing LTBI diagnosis and treatment strategies	Description: This indicator measures the status of implementing LTBI diagnosis and treatment strategies in the country. Indicator value: Score based on below: 0=no policy or practice in place; 1=policies have been developed/updated; 2=LTBI strategies piloted or implemented in limited settings; 3=LTBI strategies implemented nationally Level: National	2	3	3 (nation wide)
2	6.1.2. % of eligible persons completing LTBI treatment, by key population and adherence strategy	Description: This indicator measures the percent of eligible persons completing LTBI treatment, by key population and adherence strategy according to national policy Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of eligible persons completing LTBI treatment Denominator: Total number of eligible persons	95%	>95%	98% (152/154 children on IPT in 2014)

Objective 3. Strengthened TB Platforms

Sub-objective 7. Political commitment and leadership

Key Results:

The total budget needed by NTP is around $30 million US dollars per year. Domestic contribution would be US$ 2.76 million and from partners, around US$ 5.9 million per years (from 2015 to 2017). The New Funding Model (NFM) of Global Fund is at US$ 5.3 million each year. [4] The total funding gap is US$ 16 million (51%) each year. Adequate local and external resources (financial and technical) must be mobilized to sustain program operations in the coming years.

CENAT has signed the agreement with GFATM under the NFM and also with their 5 sub-recipients (SRs) namely Cambodian Health Committee (CHC), Catholic Relief Services (CRS), RHAC, Operation Asha and Health Poverty Action (HPA). The agreement is a 3 year grant starting from Jan 2015 to Dec 2017 with the funds of $15.6 million.[5] CTB was involved in the grant making process and program management decisions with GFATM under NFM.

The national strategic plan for TB control 2015-2020 was finalized and endorsed by NTP. It is now being translated and will be disseminated early next year.

[4] Concept note to GFATM 2014, p16
[5] GFATM at http://portfolio.theglobalfund.org/en/Grant/Index/KHM-T-CENAT

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	7.1.1. % of the national TB strategic plan that is funded (from government funds, Global Fund grants, donors, etc.)	Description: This indicator measures the percent of the national TB strategic plan budget that is funded from different sources (e.g., government funds, Global Fund grants, other donors, etc.) Indicator Value: Percent Level: National Numerator: The amount of funding allocated for TB NSP activities Denominator: Total estimated NSP budget amount	63% (18/30M)	63%	49% Other donors=$ 5.9, Governme nt budget=$ 2.76 and GF=$5.3
2	7.1.2. Status of NSP development:	Description: This indicator measures the status of NSP development. Indicator value: Score based on below: 0=The NSP is expired or not being implemented; 1=An updated/new NSP is being drafted; 2=NSP has been developed and costed; 3=NSP has been finalized, endorsed by the government and implemented Level: National	2	3	3

Sub-objective 8. Comprehensive partnerships and informed community involvement

CTB staff is member of the Country Coordinating Committee (CCC) and TB Principle Recipient-Technical Review Panel (PR-TRP). They are involved in key meetings to provide technical input and closely monitor the performance of GFATM particularly in the grant making process. In addition, CTB presented the findings of the annual TB analysis in many forums, including the Annual TB Conference and in a meeting of the TB Interagency Coordinating Committee.

Key Results:

The score of the GFATM rating was at A1 level in 2013 with average of A. There is a representative from TB civil society group in the CCM who actively participates in the meeting.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	8.2.1. Global Fund grant rating	Description: This indicator presents Global Fund TB grant performance rating results Indicator value: Score based on below: A - best, B1 - adequate, B2 - inadequate but potential demonstrated, C - unacceptable Level: National	A1	A	A
2	8.2.3. #/% of Global Fund Country Coordinating Mechanism members that are from TB patient groups or TB civil society groups	Description: The number and percent of CCM members that are from TB patient groups or TB civil society groups Indicator Value: Percent Level: National Numerator: Number of CCM members that are from TB patient groups or TB civil society groups Denominator: Total number of CCM members	1	1	1

Sub-objective 10. Quality data, surveillance and M&E

a) e-TB Manager (e-TBM) software

E-TB manager (eTBM) is a comprehensive web-based tool for Programmatic Management Drug Resistance TB (PMDT) which has been developed by MSH to track MDR-TB cases from their diagnosis, treatment, and treatment completion/cure along with the associated second line drug management. e-TBM is currently used by NTP for registering all on-going cases in 10 of the 11 MDR-TB treatment sites. The system is linked to 3 culture laboratories. Among the 10 sites, 9 e-TBM sites are uploading their required information onto the medicine module, keeping the country's second-line drug supply updated for the NTP and one under MSF's supports only upload case load and not drug and laboratory information. Treatment sites can thus order their supply needs in a timely fashion from CENAT central pharmacy.

Key Results:

In June, NTP selected and expanded e-TB manager data base system to include drug susceptible TB and the system will be technically supported by USAID's project implemented by the Futures group (Health Information, Policy and Advocacy). To accelerate and handover the implementation, two trips from external MSH experts took place to hand-over to NTP. After some delays, the handover of e-TBM from MSH to NTP is now completed.

b) Data quality audit and drug resistance TB prevalence survey

CTB also introduced a system for on-going, internal data quality improvement of NTP performance as a means for self-assessment, to enable cross-learning and serve as a data quality audit.

Key Results:

In Year 1, tools for DQA have been developed and field tested. Four randomly selected ODs were visited by a joint team from NTP and CTB to conduct DQA and provide recommendations for improvement. Issues that required attention of higher officials were raised during debriefing meetings with district and provincial authorities.

The CTB team assisted the program with regular supervisory visits. The team provided feedback from these visits to ODs and the decision-makers regularly during technical working group meetings. CTB also supported the country for the annual national and subnational data analysis and reporting.

The DR–TB prevalence survey was planned for this year was delayed. This delay was due to the delayed approval of the GFATM grant. NTP still considers developing the protocol in December 2015.

Indicator 10.2.4 on epidemiological assessment was not achieved. We experienced unexpected delays in bringing our FHI 360 PPM expert to Cambodia to conduct the review of the PPM approach as the mission preferred to review the report of another PPM assessment (done by same PPM expert) prior to their concurrence of the mission trip. Please see the description on action taken in section 6: Key Challenge during implementation and actions to overcome them.

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	10.1.1. #/% of PMDT sites reporting consistently via the ERR	Description: This indicator measures the number and percent of PMDT sites reporting consistently via the electronic recording and reporting system (ERR) Indicator Value: Percent Level: National and Challenge TB geographic areas Numerator: Number of PMDT sites reporting consistently via the ERR Denominator: Total number of PMDT sites	11	11	10
2	10.2.3. DR-TB surveillance survey conducted/completed in the last 5 years	Description: DR-TB prevalence survey has been conducted/completed within the last five years Indicator Value: Yes/No Level: National	No	Yes	No
3	10.2.4. #/% of operations research, evaluation or epidemiological assessment study results disseminated (stratified by level of dissemination: report, presentation, publication)	Description: This indicator measures the number and percent of studies (operations research, evaluation or epidemiological assessment), results of which have been disseminated (stratified by level of dissemination: report, presentation, publication) Indicator Value: Percent Level: National Numerator: Number of studies with results disseminated during the reporting period Denominator: Total number of studies conducted during the reporting period	1	1	0

Sub-objective 11. Human resource development

The CTB team in Cambodia recognizes that repetitive trainings are not an effective use of precious resources. However, in this first year of CTB, **refresher trainings** were considered necessary for health care providers at referral hospitals (RH) and health centers (HC) because of the gap between TB CARE I and CTB and Empowerment Community for Health, an USAID funded project, and significant staff turnover. At RH level, trainings were provided to 22 RHs in 12 provinces focused on TB management, treatment, data recording system and referral linkages.

Key Results:

A total of **357** RH staff from OPD, radiology, pediatric and TB units and PHD TB supervisors participated in the trainings. The trainings were interactive included cases studies and focused on clinical practices and case management.
At the HC level, refresher trainings focused on **contact investigation and semi active case finding** were conducted for **961 HC staff** from **399** health centers.
At community level, **refresher trainings** were also conducted **to 3,461** VHSGs from **1,828 villages** in **166 HCs**. The trainings focused on the use of contact screening form, roles of VHSGs to refer TB close contacts to health centers for TB screening, diagnosis and IPT services.
CENAT staff, PHD TB supervisor, OD TB supervisors, and/or FHI 360 technical staff conducted 350 on-site monitoring support visit to ensure **the quality of trainings.**

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target Y1	Result Y1
1	11.1.1. Status of system for supportive supervision	Description: This indicator measures the status of the system for supportive supervision Indicator value: Score based on below: 0=no supportive supervision guidelines developed and no consistent supportive supervision taking place; 1=supportive supervision plan developed, but not implemented systematically; 2=supportive supervision plan implemented consistently, including provision of written feedback to lower levels; 3=supportive supervision plan implemented consistently, feedback provided and evaluation of supervision plan conducted Level: National	2	2	2
2	11.1.3. # of healthcare workers trained, by gender and technical area	Description: This indicator measures the number of healthcare workers trained, by gender and technical area Indicator Value: Number Level: National and Challenge TB geographic areas Numerator: Number of HCWs trained during the reporting period	NA	6,083	6,408 (F:1,897) (CTB supported sites)

3. Challenge TB Support to Global Fund Implementation

Current Global Fund TB Grants

Name of grant & principal recipient *(i.e., Tuberculosis NFM - MoH)*	Average Rating*	Current Rating	Total Approved Amount	Total Disbursed to Date	Total expensed *(if available)*
New fund model (NFM) Cambodia TB (Year of signing: 2015 and PR: CENAT)	A2	A1	$15,664,272	$1,365,234	Not available

** Since January 2010*

In-country Global Fund status - key updates, current conditions, challenges and bottlenecks

1. Challenges of rapidly declining case finding: During the first six months (Jan-Jun 2015), Cambodia diagnosed 5,123 new smear positive cases (16% decline), 17,749 cases of all forms (15% decline), 35 MDR-TB cases (36% decline) and 3,763 childhood TB cases (37% decline). The decline may be due to under notification as a result of absence of supervision as GFATM did not approve the budget on this line activity. The problem is that government does not accept to provide GFATM hotel receipts for their stay during supervision. This stalemate has limited supervision at all levels for the past few months, and is affecting all four grants. This has also stopped the plans to do active case finding for MDR-TB.

2. Condition precedent of the Global Fund: The PR (CENAT) needs to submit the following documents to address a condition precedent by no later than 31 December 2015:
   a) An organogram on the contractual and incentivized staff positions that the National TB Program needs for implementing the program until 2020.

b) A detailed work plan describing how the Ministry of Health will assume 100% of the funding of the Staff Positions by no later than 1 January 2018.

Challenge TB involvement in GF support/implementation, any actions taken during Year 1

1. CTB as part of the CCC-OC and a partner agency:

Challenge TB continues to be part of the Oversight Committee of the Country Coordinating Committee (CCC-OC) for Global Fund grants in Cambodia. In this role, and as a partner to the Global Fund activities, CTB continues to:

a) Attend all quarterly and ad hoc CCC-OC meetings, and some of the CCC and CCC ExCom meetings;
b) Meet the Fund Portfolio Manager and her team during all their visits;
c) Respond to the needs of the Principal Recipient, CCC and the Global Fund;
d) Guide the Principal Recipient and its sub-recipients in grant implementation;
e) Assist the country to use Global Fund grants to procure drugs and diagnostics;
f) Monitor the grant and provide feedback to the decision-makers and Global Fund.

2. CTB as member of the principal recipient technical review panel (PR-TRP)

CTB continues to be member of the PR-TRP of Global Fund grants in Cambodia. As a member, CTB provides technical input in the meeting, makes queries if the target was not achieved or delayed the implementation of the activities and on the burn rate of the grant. CTB will also share lessons learned from CTB project activities.

3. **Support in NTP in negotiation with GFATM**

CTB was very active in the negotiations between the Global Fund and all four PR through a series of meetings with all parties in all key forums on procedural requirement of particularly on per diem rate of supervision and supporting documents. However, the stalemate continues. The PRs are now waiting for the Global Fund response.

4. Condition precedent of the Global Fund

The condition precedent for TB is the same as those of the other three grants. Challenge TB is working with the cross-grant consultants, whom the country has hired to work on the required documents. The draft documents will be ready by 31 October 2015. The final drafts will be ready for submission by 31 December.

4. Challenge TB Success Story

Case Study: Finding TB Cases though TB Contacts to Prevent TB Transmission and Disease Progression

Being a TB health worker for more than twenty years, Mr. Ouch A., TB village health support group (VHSG) of Phnom Sampov Health Center in Battambang Operational District, faces challenges to identify TB cases in his community and most of the time, people come to him when they are really sick. "TB disease still continues to spread despite all of the efforts", said Mr Ouch A.

In order to address these challenges, CTB proposed to conduct investigation of close contacts of TB patients. It combines an innovative strategy of timely identification of more cases of TB at an earlier stage of the illness and provides adequate treatment to reduce the risk of exposure of community members. Mr. Ouch A is one among many other VHSG that attended the training on this strategy.

In August 2015, Mr. Ouch A, worked with VHSGs to conduct a home visit of Ms. Tob aged 59, who received TB treatment in 2015 in Kampov village. He wanted to identify persons who were close contacts to her and may be infected with TB or have TB disease.

Mr Ouch A identified seven people who either live, chatted or worked with her and referred them to Health Center (HC) or Referral Hospital (RH) for investigations. "I found two additional TB cases from my contact investigation of Ms. Tob. One is her husband, and another one is her neighbor." said Mr. Ouch A. He added "the approach helps us to find more cases and is simple".

Within four months, CTB, in collaboration with CENAT, started introducing TB close contact investigations to TB supervisors from Provincial Health Departments, Operational Districts, and TB health workers at health centers, as well as village health support groups in 25 ODs between June and September 2015.

The results of contact investigations undertaken between July and September 2015 were recently reviewed in 12 ODs. A total of 5,921 close contacts (household and neighbor) were identified from 618 TB index patients.

Of 5,921 contacts, 32 were identified as active TB cases and were started on anti-TB treatment. In addition, approximately 287 children, under five years of age, were provided with isoniazid preventive therapy to prevent TB disease.

The contact investigation is showing promising results, which will contribute to the Cambodia's goal to eliminate TB.

Contact Investigation done by Village Health Support Group and health center staff. Photo credited by Ngo Menghak

5. Operations Research

No OR planned or conducted this year

6. Key Challenges during Implementation and Actions to Overcome Them

a) The **quality of diagnosis of childhood** TB has been a concern in Cambodia. The proportion of TB among children was high, over 27% of all cases in some provinces, leading to speculation that there is over diagnosis and treatment in some cases, alongside missed cases in other situations.
Actions: WHO, a key CTB partner, and FHI 360 conducted monitoring visits to 10 referral hospitals to identify the problem, and the reasons for low quality of diagnosis. The team found that: clinical knowledge of health care providers is low; they have difficulty understanding the treatment algorithm and there are poor records of the patient's clinical record forms. To address the issue, the CTB conducted trainings and on-site coaching for health care providers and ensure TB diagnosis is correctly performed.

b) TB mortality has become a critical outcome indicator for the Global Fund. Recent analyses show that health care providers are not using international formats for medical certification of cause of deaths and in addition, community councils do not classify mortality data by cause.
Actions: Through our WHO partner, CTB is supporting an effort to improve this situation by drafting a concept note with CENAT and Global Fund to strengthen the accuracy of recorded cause of mortality and subsequent data analysis.

c) One **laboratory position** is still vacant. It was difficult to find a qualified laboratory staff to meet the requirement despite several recruitment approaches.
Actions: CTB will support 50% Level of Effort (LOE) for a current WHO staff member who has been supported via GFATM at 50% LOE. He is seconded at CENAT to provide TA to National Reference Laboratory and its networks on quality of diagnosis includes the development of guideline, conduct the External Quality Assessment and on-site monitoring.

d) The **delay in signing an agreement** between FHI 360 and KNCV had an impact on field implementation. The **mechanism of financial support to government** to ensure the transparency and accountability to the donor has changed. This change requires significant efforts and time for the field staff to operate it.
Actions: CTB has used Wing, electronic money transfer, for the disbursement of per diems and transportation costs to HCW.

e) We have been unable to fine-tune the PPM approach. We have not been able to conduct an assessment or a pilot as we are waiting to share the findings from a PPM assessment conducted under TB CARE I. However, the report is now at the final stage of review and revision with PMU prior to submission to the Mission.
Actions: Country Office and technical staff are on top of this and will get the PPM assessment report finalized. The consultant has been already identified for the review and waits for the final assessment report.

f) **Epidemiological changes:** A part of the decline is also due to changes in the epidemiology of TB, as shown by the 2011 prevalence survey (e.g., lower prevalence of bacteriologic confirmed TB, hence general TB, and the epidemic is increasingly concentrated in hard-to-reach populations).
Action: To fine-tune the screening and diagnostic approaches to the epidemiological changes, and to overcome the barriers to TB care, CTB has been advising the government and its partners to use multi-symptom screening, enhanced case finding and increasing use of Xpert for the past few years. The country is scaling up these approaches gradually. However, inadequate resources are limiting these efforts.

7. Lessons Learned/ Next Steps

The successes and challenges of the USAID's CTB project provide valuable information to guide priorities for future funding. The largest technical area, Improved Access, contained activities that were high impact (semi active case finding among elderlies, contact investigation and ACF among prisoners).

A high proportion of TB cases were identified through case-finding in **the congregate setting**, **hospital setting, and community**. Whether these strategies are cost-effective needs to be analyzed, particularly with scale-up and sustainability as future goals—although they certainly appear very promising.

Prisons: Active case finding in prisons contribute to the increase of case notification rates and has an impact on the reduction of TB prevalence over years of the project (decrease from 2.2% to 1.5% in 2013 and 2015 respectively). The screening for TB symptoms at entry needs to be maintained as it helps to prevent the spread of TB in the prison from outsiders. Operationalizing of NTP's Standard of Operation Procedure in the prison setting needs to be review and re-enforced across all prisons in Cambodia. With the current political concerns and restrictions, there is a need for policy that enables TB staff to access patients in need of care as well as clear mechanisms for diagnostic testing (sputum transport, chest X-rays, etc.). With a multitude of competing priorities in the prison setting, TB does not sound as appealing as others. ACF activities are critical but they are also expensive and totally dependent upon external donors. Our success can be jeopardized if there is not continued attention and support for these efforts.

MDR-TB: Given that the country's TB/MDR-TB diagnosis gap is more critical than its treatment gap, it is imperative to identify key points within the process that may have the greatest impact on expediting diagnosis. In Year 1, CTB did not invest specifically on this area but has contributed in identifying new MDR-TB cases via referral of sputum of high-risk group patients for Xpert testing.

Laboratory: Some activities within Improved Access had variable impact such as the laboratory's external quality assurance (EQA). EQA result shows a high performance for years (<5% of false positive or false negative). Even the smear preparation and reading accuracy were high but the quality of sputum collection need to be strengthened as it impacts on the result. Sputum collection and the way to collect high quality sputum needs to be decentralized and trained at the VHSG level. While NTP has scaled up the use of Xpert machine for TB testing, TA on trouble shooting and calibration is needed to ensure that the quality of test results are accurate and the operation of machines runs smoothly.

e-TB manager software was implemented in 10 of the country's 11 PMDT treatment sites. Given the importance of recording and reporting to document MDR-TB treatment SLD management and to track the country's performance on PMDT, it is important that an electronic system for surveillance is in place, with full adoption, ownership and management of the system by the NTP. The software had been handed over to CENAT by end of September 2015. CTB will work closely with Futures group, USAID's funded project, to provide clarification on the system as need. CENAT needs to maintain the system at the 10 sites where it has implemented under CTB.

The **PMDT** technical area is a prime example; the country's treatment success rate for MDR-TB has been maintained at an average of >75% with >90% of those diagnosed put on treatment. There is, however, a significant diagnosis gap that must be addressed and is consistent with a similar diagnosis gap for drug-susceptible TB. In the first two quarter in FY15, the case notification of MDR-TB dropped by 35 MDR-TB cases, which represents a decline of 36% compared to the same quarters in 2014.

The biggest challenge is the **missing cases**, which exists for both drug-susceptible and drug-resistant TB. In contrast, NTP has been very successful in initiating treatment, thus there is no significant treatment gap in Cambodia at this time. In addition, treatment success rates have been

consistently high for both drug-susceptible and drug-resistant TB, highlighting the successful strategies for effective treatment support-- through decentralization of DOT, effective mobilization of the community, and well-coordinated multi-disciplinary teams that conduct home visits and support patients.

The persistently high prevalence rates among both men and women > 45 years old emphasize the urgency to reach the middle-aged and the elderly (>55), a risk group that has not been effectively diagnosed in the current health system. The prevalence of smear-positive and bacteriologically positive TB in the elderly is approximately four times that of the general population, and although the elderly constitute 4% of the population, they comprise 24% of those with TB. Asymptomatic patients, both AFB smear positive and negative, also comprise an unreached population, pointing to the need for improved active case finding among certain at-risk groups. Smear-negative patients, in addition, face challenges in diagnosis given the dependence on chest x-ray, which is subject to reader interpretation.

Next steps:

Coordination and collaboration with government and stakeholders: CTB only supports TA while commodities, drugs and laboratory supplies and equipment are supported from either government or other donors (e.g. GFATM). The successes that were mentioned above depend on the availability of those commodities including the availability of well-working Xpert machines, availability of cartridges, microscopes, reagents and TB drugs. Therefore, close collaboration between CTB, NTP, PHD, HC and VHSG are critical for the success of CTB project.

Community DOTs: The semi-ACF targeting elderly people and Ajar in the pagoda setting has demonstrated a promising approach to reach the elderly in rural settings and has identified a remarkable number of TB cases. This activity requires VHSG and HC staff to plan and implement this activity in their community at lower cost. Same applies for contact investigation. These approaches bring the services to the community rather than patients coming to seek care in health services at either HC or RH. More human resources are required at HC level to conduct these activities at community level.

Demonstrated in the last prevalence survey conducted in 2011, a higher prevalence rates exists in rural areas, which parallels high rates of poverty in the same regions of the country. In the rural setting, long distances from home to health facilities, low population density, and low vaccination coverage all contribute to difficulty in accessing the health system. Given that 80% of the country is categorized as rural, reaching the rural poor may be one important focus for future funding. As shown in the figure 3 (below), case notifications (blue dots) are lower in areas with higher poverty rates: household poverty rate is associated with a decrease in sputum-positive TB case notification rate in Cambodia. This necessitates geo-targeting of people who are at high risk for TB, using a multi-symptom screening approach combined with more sensitive diagnostic tools such as X-ray and Xpert. In this regard, CTB will continue to maintain focus on semi ACF and CI in those rural settings which target the at risk population.

MDR-TB: Even though the estimated number of MDR-TB is still minimal and success rate is high, the severity and negative impact of the disease are huge which require continued attention. Additionally, it was identified that GFATM is not able to fund for the up-coming years so support from other donors is necessary.

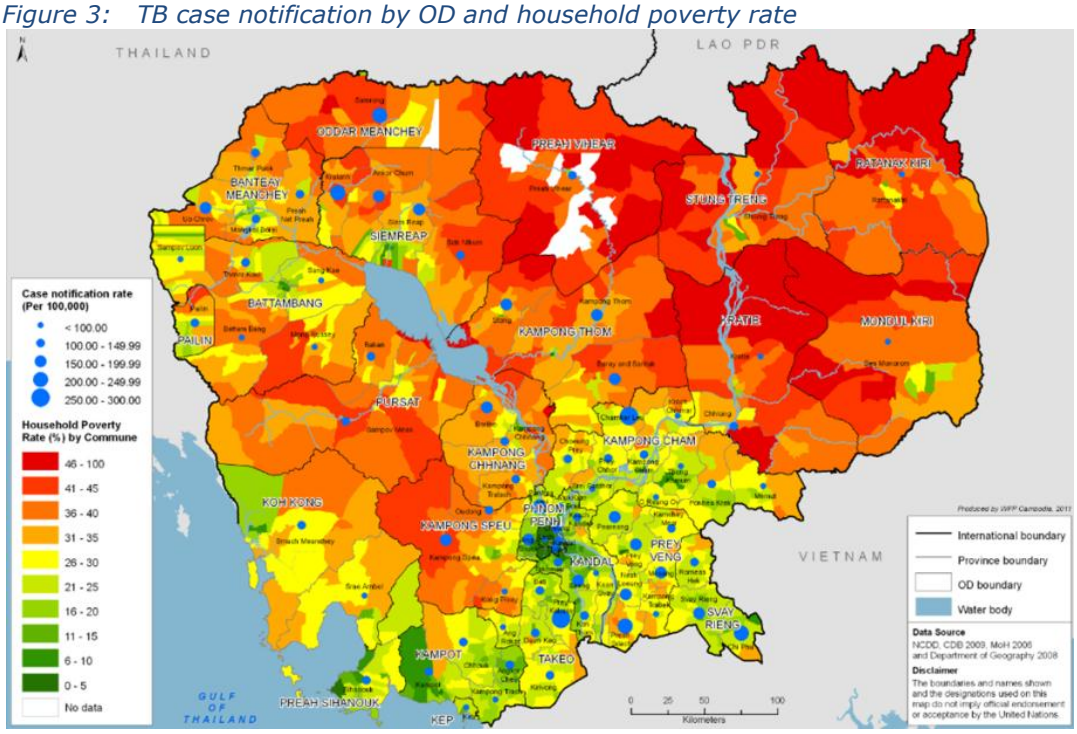
Prison setting: Even though the TB CNR in prison decreases over the years it is still higher than that of general population and these TB control activities are dependent on external donors. Therefore, we need to maintain our gains while identifying a strategy to phase-out the activity under CTB. CTB will discuss with CENAT and other partners to take over the prison activities under CTB TB support.

Hospital engagement: The hospital engagement approach provides a high yield of TB case notification; this also needs to be maintained and streamlined into a routine services. This activity needs to be conducted in collaboration with USAID's Quality Health Services for the synergic effort

at the hospital level and with Empowerment Community for Health for linkages of referral between the community and health facility level.

Laboratory: CTB will continue TA support across this area from the development of guidelines, standard operating procedures, EQA and monitoring support; these are important activities that ensure the quality of TB diagnosis. As the NTP scales- up the use of Xpert machines in the next year, our continued support regarding the orientation on the operation of the machine to laboratory staff and troubleshooting of Xpert will be critical.

Figure 3: TB case notification by OD and household poverty rate



Annex I: Year 1 Results on Mandatory Indicators

MANDATORY Indicators				
Please provide data for the following mandatory indicators:				
2.1.2 A current national TB laboratory operational plan exists and is used to prioritize, plan and implement interventions.	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Score as of September 30, 2015	0	N/A	**None**	In year 1, CTB was not investing in this area
2.2.6 Number and percent of TB reference laboratories (national and intermediate) within the country implementing a TB-specific quality improvement program i.e. Laboratory Quality Management System	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Number and percent as of September 30, 2015	0% (0/1)	N/A	**None**	There is just one National TB Reference Lab in the country, implementing only EQA, not LQMS (no GLI or SLIMTA scoring was conducted)
2.2.7 Number of GLI-approved TB microscopy network standards met	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**

Number of standards met as of September 30, 2015	N/A	N/A	**None**	No assessment was conducted in year 1
2.3.1 Percent of bacteriologically confirmed TB cases who are tested for drug resistance with a recorded result.	**National 2014**	**CTB 2014**	**CTB APA 1 investment**	**Additional Information/Comments**
Percent (new cases), include numerator/denominator	621	N/A	**None**	Denominators separately for new and previously treated cases are not available
Percent (previously treated cases), include numerator/denominator	1,354	N/A		
Percent (total cases), include numerator/denominator	15% (1,975/12,747)	N/A		
3.1.1. Number and percent of cases notified by setting (i.e. private sector, pharmacies, prisons, etc.) and/or population (i.e. gender, children, miners, urban slums, etc.) and/or case finding approach	**National 2014**	**CTB 2014**	**CTB APA 1 investment**	**Additional Information/Comments**
Number and percent	43,738 - 25,223 new cases (57.6%, Ederly $\geq$ 55 yrs) -11,992 (27%, children <15)	18,092 - 4,771 new cases (26%, Ederly $\geq$ 55 yrs) -7,100 (39%, children under 15)	**Moderate**	CTB has supported 25 operational districts, of which 9 ODs were fully supported with full package (Elderly and childhood), while 16 ODs, CTB has supported childhood TB activities only. Data is from Jan to Dec 2014
3.1.4. Number of MDR-TB cases detected	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**

Total 2014	121	N/A	**None**	
Jan-Mar 2015	20	N/A		
Apr-June 2015	21	N/A		
Jul-Sept 2015	23	N/A		
To date in 2015	64	0		
3.2.1. Number and percent of TB cases successfully treated (all forms) by setting (i.e. private sector, pharmacies, prisons, etc.) and/or by population (i.e. gender, children, miners, urban slums, etc.).	**National 2013 cohort**	**CTB 2013 cohort**	**CTB APA 1 investment**	**Additional Information/Comments**
Number and percent of TB cases successfully treated in a calendar year cohort	Getting from WHO	U	**Limited**	NTP has reported TB cases treatment successfully rate for only TB smear positive cases, but not for all forms
3.2.4. Number of MDR-TB cases initiating second-line treatment	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Total 2014	110	N/A	**None**	CTB was not working in this area in year 1
Jan-Mar 2015	17	N/A		
Apr-June 2015	19	N/A		
Jul-Sept 2015	23	N/A		
To date in 2015	59	0		

3.2.7. Number and percent of MDR-TB cases successfully treated	**National 2012 cohort**	**CTB 2012 cohort**	**CTB APA 1 investment**	**Additional Information/Comments**
Number and percent of MDR-TB cases successfully treated in a calendar year cohort	Getting from WHO	87 (87/110, 79%)	**None**	Support under TBCARE I (79% (87/110), cohort 2012) NTP report, 2014
5.2.3. Number and % of health care workers diagnosed with TB during reporting period	**National 2014**	**CTB 2014**	**CTB APA 1 investment**	**Additional Information/Comments**
Number and percent reported annually	Not collected nationwide	2.4% (6/245)	**Limited**	TB screening among HCWs was conducted in two hospitals under CTB coverage areas, namely Sampov Meas and Moung Russey. 245 HCWs were screened (F: 108), of which 6 were found to have active TB with smear negative.
6.1.11. Number of children under the age of 5 years who initiate IPT	**National 2014**	**CTB 2014**	**CTB APA 1 investment**	**Additional Information/Comments**
Number reported annually	2,300	2,300	**Substantial**	Data till Sep 2014. In this area, CTB works at national level.
7.2.3. % of activity budget covered by private sector cost share, by specific activity	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Percent as of September 30, 2015 (include numerator/denominator)	N/A	0%	**None**	CTB was not working in this area in year 1
8.1.3. Status of National Stop TB Partnerships	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**

Score as of September 30, 2015	0	N/A	**Limited**	Cambodia does not had the national Stop TB Partnership forum but it has inter coordination committee (ICC) and it functions quite regularly on quarterly basis. The member of the ICC composes of government, NGOs partners and donors. It serves as a forum to share the information, to provide technical guidance and endorse policy. Guideline and key strategic approach. So far, the forum does not have secretariat but CENAT seems to play a critical roles on this. As TCB partner consists of WHO, CTB may have a good position to provide an assistance as a secretariat.
8.1.4. % of local partners' operating budget covered by diverse non-USG funding sources	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Percent as of September 30, 2015 (include numerator/denominator)	N/A	N/A	**None**	CTB will support two local partners to implement PMDT/MDR TB and ACF activities in year 2.
8.2.1. Global Fund grant rating	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Score as of September 30, 2015	A	N/A	**Moderate**	Both FHI 360 and its partners (WHO) are the member of Principal Recipient of Technical Review Panel who actively involve and provide technical input in the meetings.
9.1.1. Number of stock outs of anti-TB drugs, by type (first and second line) and level (ex, national, provincial, district)	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**

Number as of September 30, 2015	**0**	N/A	**None**	CTB will not be working in this area, but CTB will monitor and ensure there is no stock out in CTB supported sites. Data source: Presentation at the 20th Annual TB Conference, 26-27 Mach, 2015, Phnom Penh, Cambodia.
10.1.4. Status of electronic recording and reporting system	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Score as of September 30, 2015	2	N/A	**Substantial**	CTB/ MSH develops an electronic recording and reporting system (e-TB Manager) to manage MDR -TB. The system is handed over to NTP in Sep 2015. NTP decided to accept the system e-TB Manager to implement the susceptible TB and expand for nationwide. USAID currently provides grant named Health Information, Policy and Advocacy to Futures Group to customize the eTB manager system for both drug susceptible and MRD -TB. However, the NTP has no resources and capacity to manage the e-TB Manager.
10.2.1. Standards and benchmarks to certify surveillance systems and vital registration for direct measurement of TB burden have been implemented	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Yes or No as of September 30, 2015	No	N/A	**None**	Standards and benchmark assessment was not conducted. CTB will initiate the discussion with NTP and provide overall TA.
10.2.6. % of operations research project funding provided to local partner (provide % for each OR project)	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**

Percent as of September 30, 2015 (include numerator/denominator)	N/A	N/A	**None**	No investment in this area, so N/A for CTB
10.2.7. Operational research findings are used to change policy or practices (ex, change guidelines or implementation approach)	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Yes or No as of September 30, 2015	N/A	NA	**None**	In year 1, CTB did not perform any operational research

11.1.3. Number of health care workers trained, by gender and technical area	**CTB APA 1**		**CTB APA 1 investment**	**Additional Information/Comments**
			Substantial	CTB has provided capacity for HCWs in CTB supported sites
	# trained males APA 1	**# trained females APA 1**	**Total # trained in APA 1**	**Total # planned trainees in APA 1**
1. Enabling environment	**0**	**0**	**0**	**0**
2. Comprehensive, high quality diagnostics	**0**	**0**	**0**	**0**
3. Patient-centered care and treatment	**1202**	**315**	**1517**	**854**
4. Targeted screening for active TB	**2485**	**1422**	**3907**	**5236**
5. Infection control	**0**	**0**	**0**	**0**
6. Management of latent TB infection	**809**	**152**	**961**	**847**
7. Political commitment and leadership	**0**	**0**	**0**	**0**
8. Comprehensive partnerships and informed community involvement	**0**	**0**	**0**	**0**
9. Drug and commodity management systems	**0**	**0**	**0**	**0**

10. Quality data, surveillance and M&E	**15**	**8**	**23**	**34**
11. Human resource development	**0**	**0**	**0**	**0**
Other (explain)	**0**	**0**	**0**	**0**
Other (explain)			**0**	
Grand Total	**4511**	**1897**	**6408**	**6971**
11.1.5. % of USAID TB funding directed to local partners	**National APA 1**	**CTB APA 1**	**CTB APA 1 investment**	**Additional Information/Comments**
Percent as of September 30, 2015 (include numerator/denominator)	N/A	NA	**None**	No investment in this area, so N/A for CTB

Annex II: Status of EMMP activities

Year 1 Mitigation Measures	Status of Mitigation Measures	Outstanding issues to address in Year 2	Additional Remarks
Safe procedures on sputum collection, transportation, and disposal of sputum containers will be emphasized during trainings and refresher trainings and during meetings with HC staff and VHSG. CTB staff will ensure the practice of HC staff and VHSG informing presumptive TB patients to collect sputum in open air, (an open space outside of a building or HC/Health Facility), per above-mentioned safe sputum collection procedures. CTB staff will ensure that HC staff will adhere to the following TB infection control procedures and safe management of sputum containers disposal: burning in incinerator at health center, and burying containers according to MoH medical waste management procedures presented in trainings and meetings.	CTB emphasized the safe procedures on transportation and disposal of sputum containers during trainings/meetings with health care providers and VHSGs. During the supportive supervision, CTB closely monitored the disposal of sputum containers of visited health centers, to ensure that all HCs had properly packed and burned medical wastes (sputum containers) in incinerator on a regular basis. Moreover, CTB checked with HC to see the incinerator are well functioning.	CTB will integrate EMMP checklist into TB-IC at HC level, and will be used during the supportive supervision.	

Annex IV: Geographic Coverage

	Province	Operational District	Prison inmates (n)	Elderly& children	Hospital Engagement	Childhood TB***
1	Battambang	Battambang		CTB	CTB	
		Thmar Koul				
		Sangker		CTB		
		Moung Russey		CTB	CTB	
		Sampov loon				CTB
2	Kampot	Kampot	CTB; Kampot (376)			
		Chhouk				
		Angkor Chey				
		Kg Trach				CTB
3	Kandal	Takhmao	CTB; Takhmao (970)			
4	Kampong Cham	Kg Cham- Kg Siem				CTB
		Prey Chhor		CTB		
		Cheung Prey				
		Chamkar Leu				CTB
		Srey Santhor				CTB
		Kroch Chmar				
5	Tbong Khum	Tbong Khmum	CTB; Kampong Cham (772)	CTB		
		Ponhear Krek	CTB; Correction Center 3 (1448)			
		Oreang Ov				
		Memut				
6	Kampong Chhnang	Kg Chhnang				CTB
		Kg Tralach				CTB
		Boribor				
7	Preah Sihanouk	Sihanouk ville	CTB; Sihanouk Ville (334)			
8	Kampong Speu	Kg Speu	CTB; Kampong Speu (356)	CTB	CTB	
		Oudong				
		Kong Pisey		CTB	CTB	
9	Kampong Thom	Kg Thom				CTB
		Baray Santuk				
		Staung				
10	Koh Kong	Smach meanchey	CTB; Koh Kong (299)			
		Sre Ambel				

	Province	Operational District	Prison inmates (n)	Elderly& children	Hospital Engagement	Childhood TB***
11	Prey Veng	Prey veng / Svay Antor	CTB; Prey Veng (349)			CTB
		Kamchay mear				
		Neak Loeung				
		Peareng				CTB
		Kg Trabek				CTB
		Preh Sdach				CTB
		Mesang				CTB
12	Pursat	Sampov Meas		CTB	CTB	
		Bakan		CTB		
13	Svay Rieng	Svay Rieng	CTB; Svay Rieng (320)			CTB
		Romeas Hek				
		Chi Phou				
14	Takeo	Donkeo	CTB; Takeo (340)			
		Ang Roka				CTB
15	Udor Mean Chhey	Samrong				CTB
			Total	9	5	16

*** approach is focused at health facility level with minimum support (CXR fee, capacity building)